CERTIFICATE OF TRANSMISSION BY FACSIMILE (37 CFR 1.8) Applicant(s): Ricardo V. Martija et al			Docket No. APP 1208
Application No. 09/774,976	Filing Date 03/31/01	Examiner LAZARO, David R.	Group Art Unit 2155

Invention: **Method and System for Determining Geographical Regions of Hosts in a Network**

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Appl. No. 09/774,976 Attorney Docket APP 1208 US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
R. V Martija et al
Appl. No. 09/774,976
Filed: January 31, 2001
Title: Method and System for Determining Geographical Regions of Hosts in a Network
Art Unit: 2155
Examiner: David R. Lazaro

DECLARATION
37 C.F.R. 1.131

We, Ricardo V. Martija, of South Pasadena in the County of Los Angeles, and State of California, Samaradasa Weerahandi of Millburn, County of Union, and State of New Jersey, and Walter D. Sincoskie of Hampton, County of Hunterdon, and State of New Jersey do hereby declare and state that:

We are the co-inventors of the above identified patent application.

Prior to December 29, 2000, we were employed by Bell Communications Research (Bellcore), now after March 17, 1999 known as Telcordia Technologies, Inc., the assignee of this patent application, at their research facility in Morristown, N.J. At that time we were engaged in the research and development of a system and method for determining the geographical location of a host in a public communications network, such as the Internet. Specifically, prior to December 29, 2000, we conceived and successfully operated a system, known as "netsizer", which system is described in the above identified patent application.

To operate the system successfully it was necessary to collect data for triangulation purposes; we collected data from the University of Washington, the University of Virginia, and Illinois State University. The data we collected included the number of hops and traceroute time for each of these monitoring stations.

Prior to operating the system we sorted the classifiable data, i.e., those whose locations are known, from those that were unclassifiable. We then summarized the results of the classified ones (monitor.data) and computed the covariance matrices (monitor.data.covar). We then computed Mahalonobi's distance for the unclassified ones (unknown.data). The file with the distance computations is unknown.dbg.out, and the final output is in file unknown.out.

The data files were in the following path under Martija's home directory. These data files are currently in Martija's possession and included:

rmartija/netsizer/data/tempdir/median/monitor.data.old
rmartija/netsizer/data/tempdir/median/monitor.data.covar
rmartija/netsizer/data/tempdir/median/unknown.data
rmartija/netsizer/data/tempdir/median/unknown.dbg.data
rmartija/netsizer/data/tempdir/median/unknown.out

Prior to December 2000 Martija wrote the program code for the operation of our system. That program code was set forth in program files in the following path also under Martija's home directory. These program files are also currently in Martija's possession and included:

rmartija/netsizer/scripts/getCovar.pl
rmartija./netsizer/scripts/getHostLoc.pl
rmartija/netsizer/scripts/getHostDistByLoc.pl
rmartija/netsizer/scripts/getLocalHits.pl
rmartija/netsizer/scripts/getHitsByState.pl
rmartija/netsizer/scripts/joinData.pl
rmartija/netsizer/scripts/run.classify
rmartija/netsizer/scripts/classify.pl

Attached hereto are printouts of program file " getCovar", Exhibit I, "getHostLoc", Exhibit II, and "classify", Exhibit III, showing the dates of May 25, 1999, May 20, 1999, and May 5, 1999, respectively, the dates when these specific program files were last modified.

These files and programs were employed by us at Telcordia during numerous successful operations of our invention at the Morristown, N.J. facilities of my employer prior to December 2000. We operated our system to determine a geographical region of a host in a network using the triangulation data collected to define the selected other hosts in the network at a plurality of geographical regions by determining, at a plurality of points in the network, first sets of information associated with the selected other hosts and second sets of information associated with the host whose geographical region in the network is to be determined, and then determining that geographical region based on the geographical region of one or more of the selected other hosts whose respective means of first sets of information has a shortest weighted vector distance from the second sets of information.

More specifically, we used the traceroute program to collect time delay and number of hops information from each of the monitoring stations (UW, UVa, and IllState) to each of the IP addresses on our list. For some of these addresses we knew the geographical location while for the others we did not. For those IP addresses whose geographic location we knew, we determined their characteristics by computing their covariance matrices and Mahalonobi's distances based on the time delay and hops information collected. We also computed the covariance matrices and Mahalonobi's distances for those IP addresses whose geographical locations were unknown. We calculated the Mahalonobi's distance (which is a function of all distance related measures and their covariances) between a location-unknown host from location-known hosts and

assigned it to the locality of the location-known host having the minimum distance. "Triangulation" was used to determine where these unknown IP addresses would be most likely located.

We used the program rmartija/netsizer/scripts/run.classify to invoke the program rmartija/netsizer/scripts/classify.pl. These two programs are used in the initial step of our method to select the other hosts in the network such that the selected other hosts are located in a plurality of geographical regions that are determinable.

Specifically, in successfully operating our method and system, the processes we used in determining the geographic location of hosts in a network included initially creating three rmartija/netsizer/data/tempdir/median files named illinois, virginia, and washington, respectively, and which contained the hosts whose locations (at the state level) we knew. Each of these files had four columns, as follows:

Column 1: IP address of the host whose location we knew
Column 2: State address where this P address is located
Column 3: Traceroute hops metric from a given monitoring station
Column 4: Delay metric from a given monitoring station

For columns 3 and 4, the file names identify the monitoring station. For example, the following entry in the file named "virginia"

130.132.153.175 CT 13 38

told us that host 130.132.153.175 is in Connecticut and that its hop and delay metrics as measured from our monitoring station in Virginia are 13 and 38, respectively. The program rmartija/netsizer/scripts/joinData.pl joined the information from these three files and produced an output file similar to rmartija/netsizer/tempir/median/monitor.data.old. This output file had seven columns, as follows:

Col 1: location (state)
Col 2: hop metric from Illinois monitoring station
Col 3: delay metric from Illinois monitoring station
Col 4: hop metric from Virginia monitoring station
Col 5: delay metric from Virginia monitoring station
Col 6: hop metric from Washington monitoring station
Col 7: delay metric from Washington monitoring station

The file monitor.data.old was used as the input to the program getCovar.pl to compute the covariance matrix. The output of getCovar.pl is the covariance matrix file named rmartija/netsizer/data/tempdir/median/data.covar.

For the hosts whose locations had yet to be determined, the raw data files were placed in the following files:

rmartija/netsizer/data/netsizerStats.global.ilstu
rmartija/netsizer/data/netsizerStats.global.virginia

rmartija/netsizer/data/netsizerStats.global.washington

These three files were then joined to produce the file rmartija/netsizer/data/tempdir/median/unknown.data. This output file had seven columns, as follows:

Col 1: IP address (i.e. host) whose location needs to be identified
Col 2: hop metric from Illinois monitoring station
Col 3: delay metric from Illinois monitoring station
Col 4: hop metric from Virginia monitoring station
Col 5: delay metric from Virginia monitoring station
Col 6: hop metric from Washington monitoring station
Col 7: delay metric from Washington monitoring station

Using the program rmartija/netsizer/scripts/getHostLoc.pl, we then determined the geographic location of the hosts in the file "unknown.data". The program getHostLoc.pl script took as input the "covar" and "unknown" data files and produced the output file rmartija/netsizer/data/tempdir/median/unknown.out. Thereby we successfully operated our method to determine the geographic location of hosts in a network.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States code, and that such willful statements may jeopardize the validity of the application or any patent issued thereon.

Ricardo V. Martija

Date 04/14/2005

Samaradasa Weerahandi

Date 4/25/05

Walter D. Sincoskie

Date 4/29/05